PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT

(51) International Patent Classification : Not classified — A2

(11) International Publication Number: WO 98/09091

(43) International Publication Date: 12 March 1998 (12.0

(21) International Application Number: PCT/IB97/01112

(22) International Filing Date: 19 August 1997 (19.08.97)

(30) Priority Data:

08/700,077	20 August 1996 (20.08.96)	US
08/914,622	19 August 1997 (19.08.97)	US

(71) Applicant *(for all designated States except US)*: SMITH ENGINEERING COMPANY [US/US]; 2837 East Cedar Street, Ontario, CA 91761 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: MARTIN, Gary [US/US]; 2411 Cliff Road, Upland, CA 91784 (US). CHILES, David [US/US]; 10076 Dorset, Rancho Cucamonga, CA 91730 (US).

(74) Agents: MAZZA, Michael, P. et al.; Niro, Scavone, Haller & Niro, Suite 4600, 181 W. Madison, Chicago, IL 60602 (US).

(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, VN, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG, Z Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, T European patent (AT, BE, CH, DE, DK, ES, FI, FR, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG

Published

Without international search report and to be republi upon receipt of that report.

(54) Title: PRE-HEATING OF PROCESS STREAM FOR THERMAL OXIDIZERS

(57) Abstract

A method for processing an air stream using a thermal oxidizer, by pre-heating the air stream, without the use of auxiliary h and substantially eliminating the condensation of organic or inorganic compounds within the air stream to be treated. Alternatively, c combination, the system used for this pre-heat method can also be used to accommodate intermittent higher volumes of organic or inorg compounds without the need for additional bypass hardware or any unnecessary waste of energy or capital costs.

We Claim:

1. A method for processing one or more air streams containing pollutants using a thermal oxidizer employing a heat exchanger section and an oxidation chamber, said air streams having a preselected range of pollutant concentration, said air streams also having intermittent concentration of pollutants higher than said preselected range of pollutant concentration, the method comprising the steps of:

mixing ambient air with a heated air stream from the oxidation chamber to form an intermediate air stream; and

mixing the intermediate air stream with an inlet process stream prior to directing the resulting air stream into the thermal oxidizer, wherein the resulting air stream is heated to a temperature sufficient to substantially eliminate the condensation of organic or inorganic compounds within it, and;

mixing an additional volume of the intermediate air stream with the inlet process stream having a concentration of pollutants higher than said preselected range of pollutant concentration, wherein the resulting air stream decreases the thermal efficiency of the heat exchanger portion of the thermal oxidizer.

2. The method for processing one or more air streams of Claim 1, wherein the additional volume of the intermediate air stream includes an additional volume of heated air stream from the

combustion chamber, thereby further reducing the thermal efficiency of the heat exchanger portion of the thermal oxidizer.

3. The method for processing one or more air streams of Claim 1, wherein the thermal oxidizer is a catalytic oxidizer.

4. The method of claim 1, further comprising heating said inlet air process stream with a steam coil prior to entering the thermal oxidizer.

5. The method of claim 1, further comprising heating said inlet air process stream with a natural gas burner prior to entering the thermal oxidizer.

6. The method of claim 1, further comprising heating said inlet air process stream with a heated outlet stream from the thermal oxidizer prior to said inlet air stream entering the thermal oxidizer.

7. A method for processing one or more air streams containing pollutants using a thermal oxidizer employing a heat exchanger section and an oxidation chamber, said air streams having a preselected range of pollutant concentration, said air stream having an intermittent concentration of pollutants higher than said preselected range, the method comprising the steps of:

providing a heat source in heat exchange relationship with an inlet air stream to be processed by the thermal oxidizer;

conveying the heated inlet air stream to the thermal oxidizer, whereby the inlet air stream has been heated to a

temperature sufficient to substantially eliminate the condensation of organic or inorganic compounds within it; and

removing air from the oxidation chamber of the thermal oxidizer in response to an inlet process stream having a concentration of pollutants higher than said preselected range of pollutant concentration, wherein the removal of air from the oxidation chamber derates the thermal efficiency of the heat exchanger portion of the thermal oxidizer.

8. A method for processing one or more air streams containing pollutants using a thermal oxidizer employing a heat exchanger section and an oxidation chamber, said air streams having a preselected range of pollutant concentration, said air stream having an intermittent concentration of pollutants higher than said preselected range, the method comprising the steps of:

providing one or more inlet ducts for conveying an inlet air stream to be processed to the thermal oxidizer;

providing one or more outlet ducts for conveying the heated outlet gases from the thermal oxidizer after processing;

forming a heat exchanger using the inlet and outlet ducts;

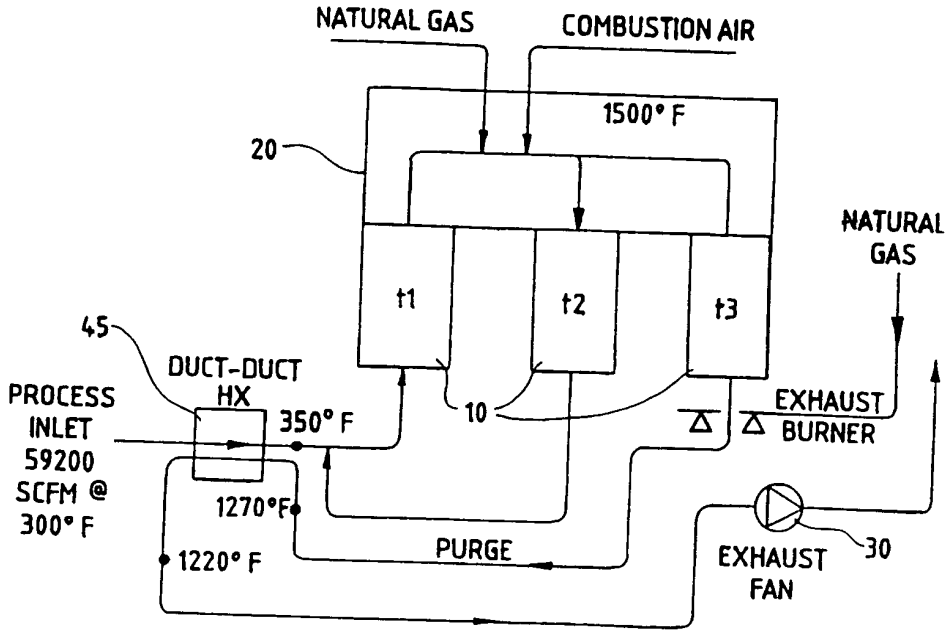
heating the inlet air stream as it passes through the one or more inlet ducts, using heat from the outlet gas as it passes through the one or more outlet ducts, wherein the inlet air stream is heated to a temperature sufficient to substantially

eliminate the condensation of organic or inorganic compounds within it; and

selectively removing an additional volume of heated air from said retention chamber to mix with an inlet air stream having a higher pollutant concentration than the preselected range, wherein the resulting air stream derates the thermal efficiency of the heat exchanger portion of the thermal oxidizer.

9. The method of claim 8, comprising the further step of heating said outlet gas with an exhaust burner exiting said thermal oxidizer prior to heating said inlet air stream.

FIG. 7



$$\theta_{\text{EXH BURNER}} = (59880)(0.062)(0.34)(1270-400)(60)$$
$$= 65.89 \text{ MMBTUH}$$